

We Claim:

1. A data output method for rendering at an output device output content managed from an information apparatus, comprising:

obtaining a document object relating to the output content managed from the information apparatus;

obtaining an output device object with one or more attributes corresponding to the output device;

providing the document object and the output device object to a server application operated on a server that is distinct from the information apparatus and the output device, and generating with the server application output data employing at least partly the document object and the output device object; and

providing the output data to the output device for rendering the output content.

2. The method of claim 1 in which the output data includes device dependent data with respect to the output device.

3. The method of claim 1 in which the providing of the output data to the output device includes transmitting the output data through a network.

4. The method of claim 1 in which the providing of the output data to the output device further comprises receiving the output data at the information apparatus and delivering the output data to the output device.

5. The method of claim 4 further comprising processing the output data before delivering the output data to the output device.

6. The method of claim 1 in which the output data comprises one or more of a page description language, a markup language, a file format, an image format, a graphics format, an audio file, and a video file.

7. The method of claim 1 in which the generating of the output data comprises at least a partial raster image processing operation on the output content.

8. The method of claim 7 in which the image processing operation includes one or more of an interpretation operation, a conversion operation, a rasterization operation, a scaling operation, a segmentation operation, color space transform operation, an image enhancement operation, a color correction operation, a half-

toning operation, a compression operation, and an encryption operation.

9. The method of claim 1 further comprising establishing a communication channel between the information apparatus and the output device and receiving one or more attributes characterizing the output device via the communication channel.

10. The method of claim 1 further comprising discovering the selected output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the output content.

11. The method of claim 10 in which the information apparatus discovers the one or more output devices with wireless communication.

12. The method of claim 10 in which the discovering of the one or more output devices includes the information apparatus sending an output service request and awaiting a response from one or more output devices.

13. The method of claim 10 in which the discovering of the one or more output devices includes one or more output devices posting their availability and the information apparatus contacting one or more of the one or more output devices.

14. The method of claim 10 in which the discovering of one or more output devices includes the information apparatus obtaining from a service node information about one or more output devices and the information apparatus contacting one or more of the one or more output devices.

15. The method of claim 10 in which the discovering of the one or more output devices involves determining if the one or more output devices satisfy one or more output service requirements.

16. The method of claim 15 in which the one or more output service requirements include one or more of price, quality of service, availability, and default output device.

17. The method of claim 10 further comprising obtaining at least partial output device objects from the one or more output devices that are discovered.

18. The method of claim 17 further comprising rendering in the information apparatus information based upon the at least partial output device objects for the one or more output devices that are discovered and obtaining from a user a selection of the selected output device.

19. The method of claim 10 further comprising selecting one of the one or more output devices that are discovered.

20. The method of claim 19 in which the selecting is related at least partly on one or more of a price indicator, a quality of service indicator, an availability indicator, a preset preference indicator, a first available indicator and a default output device indicator.

21. The method of claim 19 in which the selecting is related at least partly on a user input.

22. The method of claim 19 in which the selecting includes automatic selection.

23. The method of claim 1 further comprising obtaining at the information apparatus a job object with one or more attributes characterizing the rendering of the output content.

24. The method of claim 23 in which the job object includes an output preferences attribute characterizing one or more output preferences including one or more of output quality, layout, number of output copies, number of windows per page, color or grayscale, and output size.

25. The method of claim 23 in which the job object includes an identification attribute characterizing one or more identification features including one or more of a security setting, authentication, security information, payment information, subscription information, and user identification.

26. The method of claim 23 in which the job object includes a job attribute characterizing one or more job features including one or more of a job priority or quality of service feature, job status information indicating status of the output job, a job instruction feature indicating one or more of job queuing, cancellation, execution, and output priority.

27. The method of claim 23 in which the one or more job object attributes are obtained at least partly based on information received from the output device.

28. The method of claim 23 in which the one or more job object attributes are obtained at least partly from a user input.

29. The method of claim 23 in which the one or more job object attributes are

obtained at least partly from a preset user preference or a default.

30. The method of claim 1 in which the document object includes the output content.

31. The method of claim 1 in which the document object includes a pointer or reference to the output content.

32. The method of claim 1 in which the output content is stored on a device other than the information apparatus.

33. The method of claim 1 in which the document object includes one or more document instruction attributes that include instructions for one or more of viewing, obtaining, opening, interpreting, encoding, decoding, converting, compressing, decompressing, rasterizing, authenticating, encrypting, decrypting, or manipulating the output content.

34. The method of claim 1 in which the document object includes software code.

35. The method of claim 1 in which the document object includes a reference or pointer to another object.

36. The method of claim 1 in which the output device object includes an output device identification attribute that includes one or more of an output device brand indication, a model indication, an identification number indication, an output device type indication, and a network address indication.

37. The method of claim 1 in which the output device object includes an output device services attribute that includes one or more of a color or grayscale output indication, a laser or inkjet output indication, a duplex indication, an output quality indication, and a price per page indication.

38. The method of claim 1 in which the output device object includes an output device language attribute that indicates one or more output data languages supported by the output device.

39. The method of claim 1 in which the output device object includes an output data format attribute that indicates one or more output data format supported by the output device.

40. The method of claim 1 in which the output device object includes a

payment information attribute that indicates payment information on one or more output services provided by the output device.

41. The method of claim 1 in which the output device object includes a security attribute that indicates one or more security or authentication requirements supported by the output device.

42. The method of claim 1 in which the output device includes one of a printing device, a display device, a projection device, and an audio output device.

43. The method of claim 1 in which the information apparatus includes a portable device.

44. A data output method for rendering at an output device output content managed from an information apparatus, comprising:

delivering a document object and an output device object to a server application operated on a server that is distinct from the information apparatus and the output device, the document object related to the output content managed from the information apparatus and the output device object having one or more attributes corresponding to the output device;

generating with the server application output data employing at least partly the document object and the output device object; and

delivering the output data to the output device for rendering the output content.

45. The method of claim 44 further comprising discovering the selected output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the output content.

46. The method of claim 44 further comprising obtaining at the information apparatus a job object with one or more attributes characterizing the rendering of the output content.

47. The method of claim 44 in which the document object includes the output content.

48. The method of claim 44 in which the document object includes a pointer or reference to the output content.

49. The method of claim 44 in which the output device object includes an

output device identification attribute that includes one or more of an output device brand indication, a model indication, and a network address indication.

50. The method of claim 44 in which the information apparatus includes a portable computing device.

51. The method of claim 44 in which the output device includes a printing device.

52. In computer readable media, data output software for rendering at an output device output content managed from an information apparatus, comprising:
software for delivering a document object and an output device object to a server application operated on a server that is distinct from the information apparatus and the output device, the document object related to the output content managed from the information apparatus and the output device object having one or more attributes corresponding to the output device;

software for generating with the server application output data employing at least partly the document object and the output device object; and

software for delivering the output data to the output device for rendering the output content.

53. The media of claim 52 in which the output device includes a computer printer.

54. The media of claim 52 further comprising software for discovering the selected output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the output content.

55. The media of claim 52 further comprising software for obtaining at the information apparatus a job object with one or more attributes characterizing the rendering of the output content.

56. The media of claim 52 in which the document object includes the output content.

57. The media of claim 52 in which the output device object includes an output device identification attribute that includes one or more of an output device brand indication, a model indication, and a network address indication.

58. The media of claim 52 in which the information apparatus includes a

portable computing device.

59. In computer readable media, data output software for rendering at an output device output content managed from an information apparatus, comprising:

software for obtaining an output device object with one or more attributes corresponding to the output device;

software for providing the document object and the output device object to a server application operated on a server that is distinct from the information apparatus and the output device, and generating with the server application output data employing at least partly the document object and the output device object; and

software for providing the output data to the output device for rendering the output content.

60. The media of claim 59 in which the output device includes a computer printer.

61. The media of claim 59 further comprising software for discovering the selected output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the output content.

62. The media of claim 59 further comprising software for obtaining at the information apparatus a job object with one or more attributes characterizing the rendering of the output content.

63. The media of claim 59 in which the document object includes the output content.

64. The media of claim 59 in which the output device object includes an output device identification attribute that includes one or more of an output device brand indication, a model indication, and a network address indication.

65. The media of claim 59 in which the information apparatus includes a portable computing device.

66. A data output system for rendering at an output device output content managed from an information apparatus, comprising:

means for obtaining a document object relating to the output content managed from the information apparatus;

means for obtaining an output device object with one or more attributes

corresponding to the output device;

means for providing the document object and the output device object to a server application operated on a server that is distinct from the information apparatus and the output device, and generating with the server application output data employing at least partly the document object and the output device object; and

means for providing the output data to the output device for rendering the output content.

67. The system of claim 66 in which the output device includes:

an output engine that can output the output content to an output medium in accordance with a device-dependent output data acceptable to the output engine;

a connection to an output controller having:

means for providing at least part of the output device object to the information apparatus, and

means for receiving an output data from the information apparatus, and

means for passing the output data to the selected output device for rendering of the output content.

68. The method of claim 67 in which the output medium includes one or more of a substrate, a paper, a display screen, and a projection.

69. The system of claim 67 in which the output controller further comprising means for storing one or more output device objects with one or more attributes corresponding to the one or more output devices.

70. The system of claim 67 further comprising means for receiving plural service requests from plural information apparatuses, the output controller providing the at least part of the output device object to each of the plural information apparatuses.

71. The system of claim 67 further comprising means for receiving from the information apparatus device-specific output data corresponding to the output content to be rendered at the selected output device.

72. The system of claim 67 in which the output controller further includes means for providing the at least part of the output device object to the information apparatus as unsolicited information without a request therefor from the information

apparatus.

73. The system of claim 67 in which the at least part of the output device object is provided to the information apparatus in more than one communication session with the information apparatus.

74. The system of claim 67 in which the output device includes a printer.

75. The system of claim 74 in which the printer includes a printer controller, the output controller further includes means to converting the output data into a form compatible with the printer controller.

76. The system of claim 74 in which the printer does not includes a printer controller; the output controller further includes means to converting the output data into a form compatible with the printer engine

77. The system of claim 67 in which the output controller further includes means for implementing payment processing as compensation for rendering of the output content on the output device.

78. The system of claim 67 in which the output controller further includes means for implementing job management functionalities with one or more of data output job queuing and spooling.

79. The system of claim 67 in which the output controller further includes means for providing a user interface for receiving user-implemented modifications of the controller.

80. The system of claim 67 in which the output controller further includes means for implementing a security procedure that limits access to the rendering provided by the selected output device.

81. The system of claim 80 in which the security procedure includes storing in a memory component an access control list specifying an information apparatus for which the selected output device will render output content.

82. The system of claim 80 in which the security procedure includes one or more of a subscription indicator, a login, a password, and an authentication.

83. The system of claim 67 in which the output controller is included in the output device.

84. The system of claim 67 in which the output controller is separate from the

output device.

85. The method of claim 67 in which the output data received by the output controller includes a device dependent data acceptable to the output engine.

86. The system of claim 67 in which the output controller further includes means for converting the output data content into a form compatible with the output engine.

87. The system of claim 67 in which the output controller further includes means for performing at least partially, raster image processing operations on the output data.